BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

PATENT SPECIFICATION

941,148

DRAWINGS ATTACHED

941,148

Inventors: BRIAN HARDING, ERNEST HOPKINS and MAURICE RHODES TOWNEND

Date of filing Complete Specification: Oct. 5, 1962.

Application Date: Oct. 5, 1961. No. 35873/61.

Complete Specification Published: Nov. 6, 1963.

Index at acceptance:—Class F2, VJ4B.

International Classification:—F 06 k.

COMPLETE SPECIFICATION

Improvements in or relating to Non-Return Fluid Valves

We, BELL'S ASBESTOS AND ENGINEERING LIMITED, of Bestobell Works, Slough, Buckinghamshire, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to non-return fluid valves whether of the automatic type or whether capable of being urged into the closed position by a hand-wheel or similar device.

Non-return fluid valves and in particular globe valves which have previously been proposed have suffered from the disadvantage of intermittent closure on the presence of return flow and this has been due primarily to the return flow pressure not being able to force the valve clack against its seat and thus close the valve. The valve clack is normally provided with a shank which enters a recess in the valve cover and is a sliding fit therein. When the clack is held away from the valve seat by line pressure, the upper surface of the clack is shielded or partially shielded from return flow pressure by the valve cover or guides for the clack and this minimises the effectiveness of the return flow pressure in forcing the valve closed.

It has been proposed to overcome this difficulty by the provision of springs which urge the valve clack to its closed position but the use of springs suffers from the disadvantage that the valve thereby becomes less sensitive to line pressure. Also, after having been in use for some time, the effectiveness of the springs will diminish. If, as in previous proposals, the return flow cannot impinge fully upon the upper surface of the valve clack, the return flow pressure on the under side of the clack will tend to maintain the valve in its open position.

It is the main object of this invention to provide a non-return fluid valve which overcomes the above difficulty in a simple manner.

[*Price 4s. 6d.*]

According to the present invention there is provided a non-return fluid valve having a body and a cover, said body having a partition with an aperture therein in a flow path between an inlet and an outlet within which is mounted a seat which co-operates with a clack, in which a pressure plate is attached to the clack for movement therewith, said plate being in the path of return flow of the fluid and being located, when the clack is in the valve open position, within the valve aperture or on the inlet side thereof, whereby the return flow will impinge on the plate and urge the clack to the closed position. The pressure plate may be attached to the clack by a rod co-axial with the clack. The length of the rod is such that, with the clack in the open position, the pressure plate lies immediately below and far enough away from the valve aperture so that it will not restrict the flow area and will be fully influenced by return flow, whereas when the valve clack is in the closed position, the pressure plate will be positioned so as not to prevent the effective closure of the clack. The pressure plate may, when the clack is in the valve open position, be positioned within the valve aperture which in this case will have to be oversized to allow full flow area therethrough.

In order that the invention may more readily be understood, two embodiments thereof will now be described by way of example only and with reference to the accompanying drawings, in which; Fig. 1 is a longitudinal cross-sectional view through a non-return fluid valve constructed in accordance with the invention showing the valve clack in the closed position; Fig. 2 is a view similar to that of Fig. 1 but showing the clack in the open position; and Fig. 3 is a longitudinal cross-sectional view through a modified non-return fluid valve constructed in accordance with the invention.

Referring now to the drawings and first to Figs. 1 and 2 which show a non-return fluid

valve which operates automatically. The fluid valve includes a valve body 1 and a valve cover 2 of standard form, the two parts being in screw-threaded engagement. The body 1 is provided with a partition 3, having an aperture 4 therein within which is mounted a valve seat 5. The valve cover 2 has a recess 6 within which slides the shank 7 of a valve clack 8 for co-operation with the valve seat 5 for closure of the valve. Opening of the valve clack 8 is limited by the upper end of the shank 7 abutting the upper wall of the recess 6. The shank 7 is hollow and one or more small apertures 9 are provided in the wall thereof so as to allow equalisation of the pressure between the interior of the shank 7 and the through passage of the valve. The presence of these small apertures 9 effectively prevents any detrimental cushioning of the valve clack 8 due to a possible pressure build-up within the shank.

Fixed co-axially with the valve clack 8 and extending downwardly therefrom through the valve seat 5 is a rod 10 at the lower end of which is attached a circular pressure plate 11 arranged at right angles to the axis of the rod 10. The length of this rod is so chosen that, with the valve clack 8 in its open position, as illustrated in Fig. 2, the pressure plate 11 lies immediately below the valve seat 5. However, the length of rod 10 may be such that, when the clack 8 is in the valve open position, the pressure plate 11 lies within aperture 4. The inlet end of the valve is indicated at 12, and the outlet end at 13 and it will be seen that the aperture 4 lies in a flow path between them.

In use, when line pressure is flowing through the valve the valve clack 8 will be in the open position as illustrated in Fig. 2 and will be in this position at the commencement of return flow. The path of the return flow is indicated by the arrows 14 and it will be appreciated that this return flow will impinge upon the pressure plate 11 and tend to force it downwardly thereby drawing the valve clack 8 to the closed position as illustrated in Fig. 1. When the valve clack 8 is in the closed position and inlet pressure is present, the pressure plate 11 will lie within the chamber 15 on the inlet side of the valve seat 5 and equal pressures will impinge upon both sides of the plate. The pressure plate will therefore not affect the sensitivity of the valve.

In a further embodiment illustrated in Fig. 3, the valve cover 16 has a central bore 17 which receives a spindle 18 having at its outer end a valve handwheel 19 or similar device for hand operation of the valve. The lower end of this spindle enters the shank 7 of the valve clack which is hollowed at 20. The lower end of the spindle is provided with a collar 21 which retains a distance washer 22 loosely on the spindle. This washer 22 is counterbored at 23 so that it cannot inadvertently become engaged with the screw-thread 24 on the spindle 18 when the spindle is rotated. The purpose of this distance washer 22 is to prevent the spindle 18 from being unscrewed too far out of the valve. The lower end of the valve clack is provided with a rod 10 and pressure plate 11 as in the previous embodiment.

It will be appreciated that the invention is not limited to the two embodiments above described but may be modified as desired within the scope of the appendant claims, for example, the pressure plate may take any convenient shape and may be either a flat disc or may be dished with its concave surface facing towards the valve clack.

WHAT WE CLAIM IS:—

1. A non-return fluid valve having a body and a cover, said body having a partition with an aperture therein in a flow path between an inlet and an outlet within which is mounted a seat which co-operates with a clack, in which a pressure plate is attached to the clack for movement therewith, said plate being in the path of return flow of the fluid and being located, when the clack is in the valve open position, within the valve aperture or on the inlet side thereof, whereby the return flow will impinge on the plate and urge the clack to the closed position.

2. A non-return fluid valve as claimed in Claim 1, in which the pressure plate is attached to the clack by a rod co-axial with the clack.

3. A non-return fluid valve as claimed in either Claim 1 or Claim 2, in which the clack has an integral shank which slides in a recess in the cover.

4. A non-return fluid valve as claimed in Claim 3, in which a spindle passes through the cover and has at its outer end a handwheel or the like and at its inner end enters the shank of the clack and in which the lower part of the spindle is provided with a distance washer mounted freely thereon which prevents the spindle being moved too far in the opening direction.

5. A non-return fluid valve as claimed in any one of the preceding Claims, in which the pressure plate is a flat disc.

6. A non-return fluid valve as claimed in any one of Claims 1 to 4, in which the pressure plate is dished with its concave surface facing the clack.

7. A non-return fluid valve substantially as herein described with reference to either Figs. 1 and 2 or Fig. 3 or the accompanying drawings.

URQUHART-DYKES & LORD,
Maxwell House, 11, Arundel Street,
Strand, London, W.C.2,
and
12, South Parade, Leeds, 1, Yorks.,
Chartered Patent Agents.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press (Leamington) Ltd.—1963. Published by The Patent Office, 25 Southampton Buildings, London, W.C.2, from which copies may be obtained.

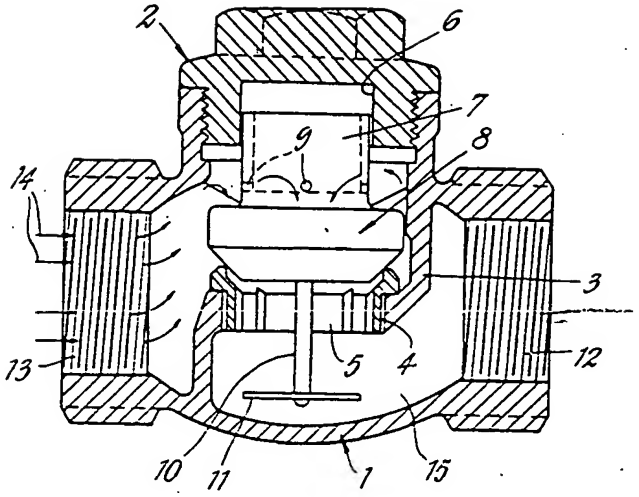

FIG.1

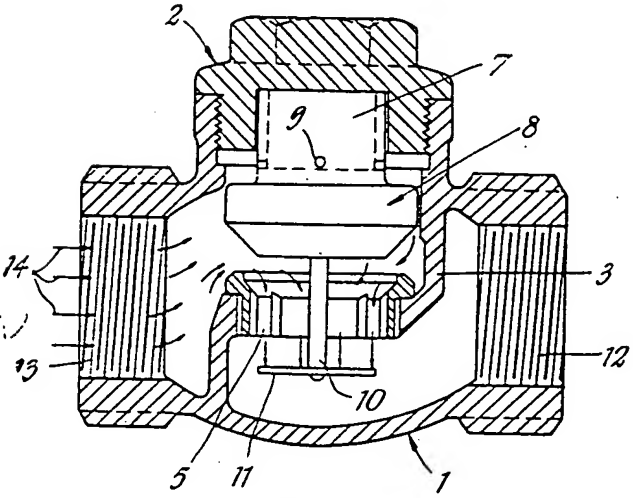

FIG.2

137

941,148

476

941148 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheets 1 & 2

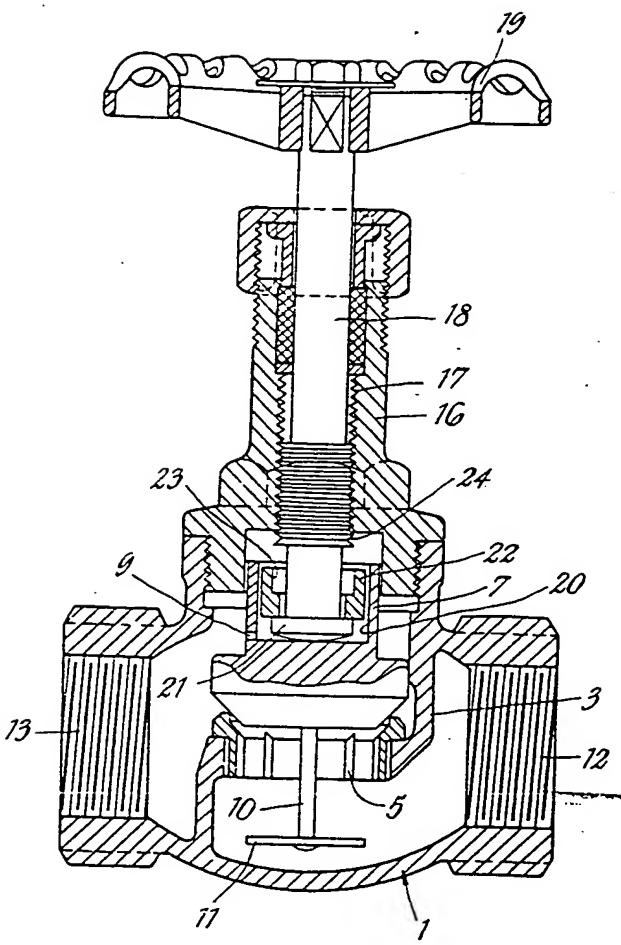

FIG.3